

How Knowledge, Experience, and Educational Level Influence the Use of Informal and Formal Sources of Home Canning Information

Abstract

In the research study reported here, West Virginia University Extension educators surveyed the public about their current canning knowledge and practices in 2010. The results showed that educational background and canning experience were the most important factors in understanding how clients seek canning information and the degree to which they preserve foods safely. Home canners primarily use family members as first sources of canning information and consider Extension one of the less important sources of information. Improved marketing efforts are needed to increase canners' understanding of the importance of formal canning sources, especially those offered by Extension programs.

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Introduction

WVU Extension county offices are inundated with requests for information about safe canning methods. Little is known about what influences canners' decisions to ask a friend or family member, contact Extension, participate in trainings, or search the Internet for information about canning. West Virginia University Extension educators asked their clientele how they obtained canning information and what methods they used. The results showed that educational background and canning experience were the most important factors in understanding how clients seek information and how Extension can influence healthy canning behaviors.

Literature Review

Home canning continues to be a popular means of preserving food (Andress, D'Sa, Harrison, Harrison, Kerr, & Nummer, 2002). Since the late 19th century, the USDA has published recommendations for home-canning processes, pickling, and sugar concentrates (jams and jelly products). The level and type of home-canning activity have increased and decreased throughout the years due to societal, familial, economic, and weather conditions. Many of today's home canners view canning as an art

form as much as a science endeavor (& et al., 2002).

The reasons for Extension's involvement in the home preservation area are obvious. Using unsafe practices could lead to the occurrence of foodborne illness, or food spoilage (D'Sa, Andress, Harrison, & Harrison, 2007). Extension-led educational programs have been shown to be successful. One study of 203 canners who had attended Extension programs found significant increases in the percentages of those who practiced safe food handling behaviors (Van Laanen & Nies, 1995). In another Extension study, childcare providers in a food safety course significantly improved their knowledge and behavior related to food safety. The study found that change in childcare providers' knowledge of safe food handling practices is a reasonable indicator for predicting subsequent change in food handling behaviors (Jayaratne, Harrison, & Bales, 2009).

An early study revealed that Extension professionals should not assume that clientele will adapt home-canning recommendations simply because they are new or research-based. Although study participants were experienced canners, one-third refused to follow the advice in the bulletin, one-third was unwilling to change from the "old" methods, and one-third had not followed the directions closely (Raab, 1990).

Studies of preservation practices (Andress et al., 2002; D'Sa et al., 2007) have documented the following risky behaviors:

- Family and friends are cited as the source of canning directions, so little can be discerned about the scientific basis of the instructions being used.
- The USDA and Extension Service often are not cited as the source of information.
- Twenty-nine percent of canners adapt recipe directions.
- Many canners do not use pressure-based processing temperatures for low-acid foods.
- Altitude adjustments in processing temperatures or times are not always made.

A repeat of the 2007 study yielded similar findings; therefore, not much progress had been made in the 5 years between studies. At the University of Maine, Extension educators respond to consumer questions about food preservation by using an email group. This method proved successful, as 82% reported that the information they received influenced their actions, and 50% said that the information helped reduce their risk for foodborne illness (Majka, Calder, & Conroy, 2010). Other approaches to food safety education are needed, and these approaches should be based on the needs and preferences of Extension clients.

Research Questions

The research questions for this study included the following:

1. What is the relationship, if any, between:
 - a. Use of safe home-canning practices and level of education?

- b. Use of safe home-canning practices and age?
 - c. Years of canners' experience and where they get canning information?
2. Where do home canners gain knowledge about canning?

Research Methodology

A group of Extension faculty members responsible for delivering canning practices and food safety programs formed a research team in 2010 to collect information about canning practices. The survey included demographic, canning knowledge, and canning experience questions, and questions about the source of the respondent's information on canning practices. The instrument was not piloted, but a cognitive review was conducted with Extension faculty members and Extension clients, and changes were made based on the feedback. A purposeful sample methodology was chosen to survey individuals who may or may not have had contact with Extension educators. The team thought that the best place to find this kind of population was at West Virginia fairs. A booth was set up at 10 county fairs and at the West Virginia State Fair, where visitors were asked to complete a paper survey. No personal or identifiable information was included, and respondents were informed that they could refuse to fill out any questions and that all information would be analyzed in the aggregate. Overall, 1,633 questionnaires were collected from home canners.

The research project was funded by a WVU research seed grant. The protocol was approved as exempt by the WVU Institutional Review Board.

The evaluation specialist oversaw the input and analysis of data using SPSS. Descriptive statistics and Pearson Chi Square tests were used. Two modifications were made to the database. First, answers to knowledge questions were coded as correct or incorrect. Second, sources were combined into three categories, including: (1) informal sources (family, friends, and neighbors), (2) formal sources (reputable canning books and Extension office advice, including the National Center for Home Food Preservation website), and (3) non-Extension Internet sites.

Results

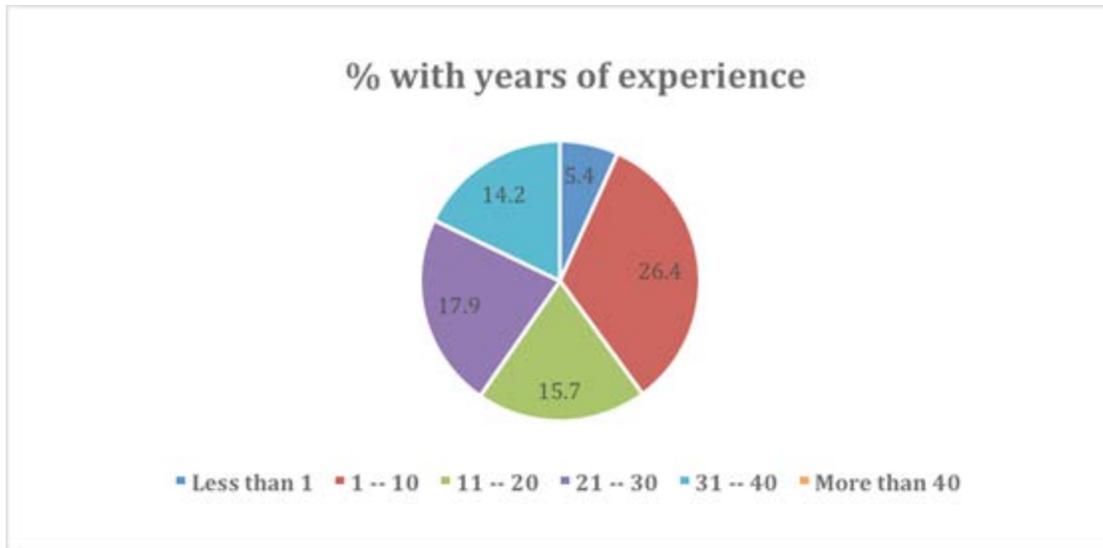
General Findings

- 84.3% of respondents had canned foods within the past year; 15.7% of respondents had canned in the past but were no longer canning.
- 86.9% of respondents were female; 12.9% of respondents were male.
- The age of respondents was somewhat evenly dispersed, with the two smaller groups being under 30 and 80 or older.
- Participants represented all categories of education. The majority (32.5%) were high school graduates. People with 1 to 3 years of college represented the next higher category (30.4%). The

smallest group of participants had no high school diploma (5.9%).

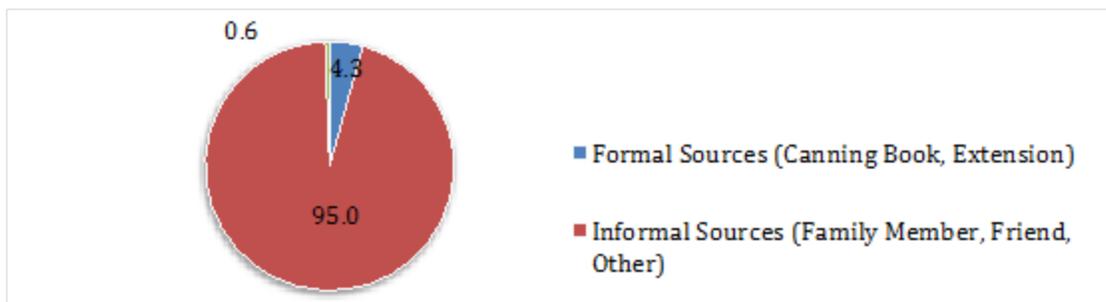
- Ethnicity data mirrored the state's population data: 98.2% were White/Caucasian
- Participants' years of experience home canning showed that most were experienced canners (Figure 1).

Figure 1.
Participants' Years of Experience



- Most people got their information about canning from informal sources (Figure 2).

Figure 2.
Formal vs. Informal Canning Sources



- The local Extension office is one of the less frequently used sources of information for canners of all experience levels and ages.

Several comments showed respondents either did not know the Extension Service was a source of canning information or that they did not know how to reach their Extension Office.

Findings Related to Research Questions

Question 1: What is the relationship, if any, between the use of safe home canning practices and level of education?

The higher the level of education, the more people were aware of safe canning methods. Data showed statistical significance in the relationship between safe practices and level of education ($p < .001$). The Pearson Chi-Square was also high (41.08). This means that the differences in the knowledge of safe home-canning practices among education groups are statistically significant. The following descriptive statistics stood out:

- 50% of those having four or more years of college answered six questions correctly out of seven.
- 41% of those having up to three years of college answered six questions correctly.
- 37% among those having 12 years of secondary schooling answered six questions correctly.

A Pearson chi square analysis of the highest level of educational attainment and years of canning experience indicated that respondents with lower educational attainment tended to have more experience with canning (value = 86.395; $p < .02$). Respondents with 4 years of college or more had fewer years of experience canning.

Question 2. What is the relationship, if any, between use of safe home-canning practices and age?

The preliminary cross-tabulation analysis did not reveal any relationships between canning practices and age. To deepen the analysis, we compared the strength of predicting power of age and level of education to knowledge about canning practices using regression analysis. The dependent variable was the index of safe canning practices; the independent variables were age, years of canning experience, and level of education. The analysis shows that age alone is not significant in predicting the level of knowledge about safe canning ($p\text{-value} > .05$), although the older respondents are slightly more knowledgeable. Level of education still matters ($p\text{-value} < .001$), as well as years of canning experience ($p\text{-value} = .008$). The standardized beta coefficient was higher for level of education ($B = .165$), with lower coefficient for years of canning experience ($B = .085$), meaning level of education influences that knowledge more strongly.

Question 3: What is the relationship, if any, between the years of canners' experience and where they get canning information?

Informal Sources

Analysis showed the following about informal sources:

- Between 70% and 85% of all respondents used informal sources.
- People with less canning experience used informal sources more often (about 85% to 82%).

- After 20 years of experience, the percentage using informal sources drops from 82% to around 73% and then stays almost unchanged. The reason might be that the longer people live, the less likely their grandmother, mother, or aunt is still alive.
- The difference in percentage of those using informal sources by different "canning experience" groups was statistically significant (p-value=.002).

Formal Sources

The opposite was true for formal sources. The percentage of respondents using formal sources ranged from 68% among those having less than one year of experience to about 86% among those with more than 40 years of experience. The difference in percentage using formal sources by different "canning experience" groups was statistically significant (p-value<.001). The more years of canning experience people had, the more often they used formal sources.

Internet

The Internet, as a source of canning information, was very important for 41% of people who had less than 1 year of experience. After 1 year of experience, the importance of this source of information decreased and was very important for only about 30 to 32% of people. This percentage did not change for people with different years of experience. Only the oldest people with canning experience of 40 and more years used the Internet less. Only 25% of them used Internet as a source. When comparing the use of Internet for different age groups, the same percentage of people (30 - 33%) across all groups (except 71 years +) found this source very important.

Conclusions

- People with higher levels of education are more likely to use safe canning practices.
- Age has no apparent effect on the use of safe canning practices.
- People with fewer years of canning experience are more like to use informal canning resources.
- People with more years of canning experience are more likely to use formal canning resources.
- After 20 years of experience, the use of informal sources decreases and does not change dramatically afterwards.
- Family members are the most likely first source of information for canners of all ages and experience levels.
- The Internet is one of the less frequently used sources of canning information for all ages and experience levels.

Implications and Recommendations

1. The average level of respondent knowledge about safe canning is fairly high but may need improvement since the majority of people had only five to six correct answers out of seven.
2. What matters to safe canning practices is level of education and years of canning experience. Training under-educated people about safe canning may result in improved food safety. The longer people take part in canning, the safer practices they use. Different levels of training for inexperienced and experienced canners should be considered.
3. Extension educators should provide clients opportunities to practice their skills.
4. Almost everyone (90% of respondents) named family members as their initial source for canning information. Family canning trainings should be considered.
5. Formal sources (mostly canning books) are somewhat less important in the beginning of one's canning experience, but they become more important than informal sources once people gain experience. Extension offices should consider lending libraries of canning books and videos on appropriate canning techniques.
6. The Internet is still an important source of canning information, although less important than other sources. New canners should be directed to reliable canning resources on the Internet.
7. Finally, improved marketing efforts are needed to:
 - Increase canners' awareness of the existence of and importance of formal canning sources.
 - Persuade clients to use formal canning sources, rather than relying on friends and relatives.
 - Make canners aware that the Extension Service is a reputable source of safe food preservation information.
 - Reach potential clients through traditional media and social media.

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References

- Andress, E. L., D'Sa, E. M., Harrison, J. A., Harrison, M. A., Kerr, W. L., & Nummer, B. A. (2002). Current home canning practices in the United States. *Institute of Food Technologists Annual Meeting*. Anaheim, CA, June 17, 2002. Retrieved from:
http://www.uga.edu/nchfp/papers/2002/canning_survey.html
- D'Sa, E. M., Andress, E. L., Harrison, J. A., & Harrison, M. A. (2007). Survey of home canning practices and safety issues in the United States. *Institute of Food Technologists Annual Meeting*. Chicago, IL,

July 29, 2007. Retrieved from: http://www.uga.edu/nchfp/papers/2007/canning_survey.html

Jayaratne, K. S. U., Harrison, J. A., & Bales, D. W. (2009). Impact evaluation of food safety self-study Extension programs: Do changes in knowledge relate to changes in behavior of program participants? *Journal of Extension* [On-line], 47(3) Article 3RIB1. Available at: <http://www.joe.org/joe/2009june/rb1.php>

Majka, A., Calder, B. & Conroy, J. (2010). An e-mail model to answer consumer questions during times of staff shortages. *Journal of Extension* [On-line], 48(3) Article 3IAW6. Available at: <http://www.joe.org/joe/2010june/iw6.php>

National Center for Food Preservation. So easy to preserve. Retrieved from: <http://nchfp.uga.edu/>

Raab, C. A. (1990). Changing practices: A caution. *Journal of Extension* (Online), 28(4) Article 4RIB1. Available at: <http://www.joe.org/joe/1990winter/rb1.php>

Van Laanen, P. G., & Nies, J. I. (1995). Evaluating Extension program effectiveness: Food safety education in Texas. *Journal of Extension* (Online), 33(5) Article 5FEA4. Available at: <http://www.joe.org/joe/1995october/a4.php>

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